OPERATING INSTRUCTIONS
FOR THE ALLEN E-296
SPOT AND ARC WELDER

CONTENTS

ALLEN ELECTRIC AND EQUIPMENT COMPANY

MANUFACTURERS OF TUNE-UP,
BATTERY, ELECTRICAL AND WELDING EQUIPMENT
2101-2117 NORTH PITCHER STREET
KALAMAZOO 13F, MICHIGAN, U. S. A.

Printed in U.S.A. 2C8 - 2145

- FOREWORD -

The art of welding which, in the past, required considerable experience and was kept somewhat of a mystery by those familiar with it has, through the introduction of coated rod and A.C. Welders, become a greatly simplified procedure that can be mastered by anyone having a steady hand, and a willingness to practice.

The purchaser of an Allen Welder, who has had no previous experience in welding, cannot expect at the first attempt to do the same class of work that will be possible at a later date. However, this is no reason for becoming discouraged or condemning the Welder.

- TECHNICAL DATA -

SPOT WELDER	Primary Draw Amps	Voltage	When Welding
	41.25	217	Two pieces of 16 gauge
	44.9	217	Two pieces of 18 gauge
	46.5	220	One piece of 18 gauge
	48	215	With tongs shorted.

ARC WELDER	Heat Stages	Prim. Amps.	Sec. Amps.	*Sec. Volts	**Sec. Volts	KVA	Power Factor	***K.W..	H.P.
	No. 1	7½	17½	20	80				
	6	18	28	22	100				
	7	20	44	25	95				
	12	30	50	25	100				
	13	34	80	30	95				
	18	46	88	25	100				
	19	46	132	30	60				
	24	51	160	25	80				
	25	40	200	30	45				
	30	52	250	35	53	11.4	55%	6.3	8.4

* Closed circuit (welding voltage).
** Open circuit.
*** KW times rate per KW equals cost per hour for current. (Example: - 6.3 x 5¢ = 31.5¢ per hour).

- BASIS FOR FIGURING FIXED CHARGES -

KVA	Theoretical Horsepower	Connected Load 50% Power Factor	Connected Load-Fixed cost at 50¢ per month per H. P.
11.4	15.3	7.7	3.85

Some arc welder manufacturers show on the nameplate of their welders approximately 70% of the catalogued rating of the welder; for instance, a 250 ampere machine at 170 amperes and a 200 ampere machine at 135 amperes. If, in such cases, power companies accept the nameplate rating without making tests, the Allen Welder is at a disadvantage, which condition should be called to the power company's attention.

It is suggested that purchasers of the Allen Welder check with the power company, in order to determine the various rate classifications that are available. A certain classification which might be most advantageous for one user might not be for another, because of the variation between users in the amount of energy required. For the same reason, a classification change is sometimes advisable as energy requirements increase and usually the power company is perfectly willing to advise which classification the customer should use in order to obtain the lowest possible power cost.

- PURPOSE OF THE EQUIPMENT -

The E-296 was designed to furnish a fast and efficient means of welding the various sheet metal parts of an automobile, such as metal roofs, quarter panels, cowls, rear deck lids, door panels, torn fenders, etc., by the same method as used in the original manufacture.

This method of welding insures a tighter and better job than can be obtained in any other way, and, in addition, enables getting into out-of-the-way places, such as where the quarter panel joins the roof.

- WRITING THE FACTORY -

Should it be necessary to communicate with the factory, relative to your equipment, **ALWAYS** furnish the name, model #, and serial #, to insure prompt service.

- ASSEMBLY AND CONNECTIONS -

Both the Spot and Arc Welder are assembled complete in the same cabinet, and after the crate is removed, it is only necessary to insert the casters in the base, and make the electrical connections as follows:

Remove the top from the Welder by unscrewing the four screws, one in each corner. This will allow the operator to get inside the Welder to make the necessary A.C. connections. One end of the 3-wire A.C. cable should be brought through the insulated hole in the rear panel of the Welder, and connected to the brass terminals of the bakelite terminal block inside the Welder cabinet.

The **RED** lead should be connected to the **GROUND** terminal, which is the terminal with the cadmium plated screw.

The other two leads should be connected to the brass terminals (the two end terminals of the terminal block).

The other end of the 3-wire A.C. cable should be connected to a 220 volt, single phase line of the same cycles as shown on the Welder nameplate, and the **RED** wire with the unstripped end should be grounded to the incoming line box, or to the metal conduit.

DO NOT connect the red wire, which is the ground cable, to **the incoming** supply line.

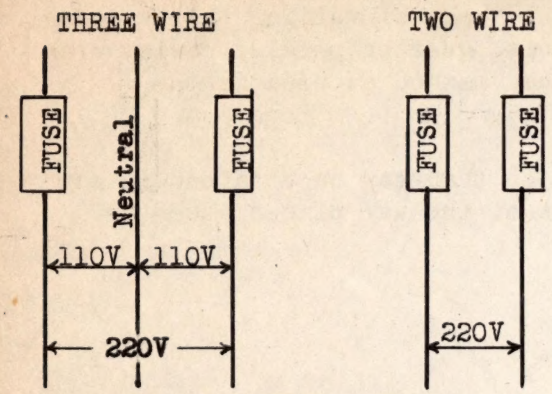
After these connections have been made, place the Welder top on the case, approximately square; the four screws will line up and go into tap holes in the grill assembly, to hold the top on.

If it is desired to operate the Welder at its maximum capacity of 250 amperes, the A.C. line must be fused with 60 ampere fuses. However, if the Welder is to be used in a shop where only body welding, or other light or medium work is to be done, at 2/3 or less of its normal output, 40 ampere fuses are sufficient. If the Welder is to be operated in plug taps Nos. 4 and 5, it will be necessary to have 60 ampere fuses on the line.

The service wiring in the building should be sufficiently heavy to carry the primary current required, and in case re-wiring to the Welder is necessary, a licensed electrician will install the wiring of sufficient capacity to give top performance.

The sketches at the top of the following page illustrate various wiring systems, from which single phase 220 volt current can be obtained for operation of the Welder

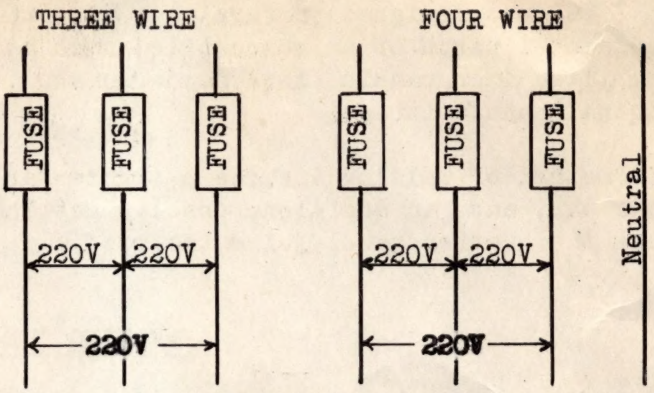
- 220 VOLTS MAY BE OBTAINED FROM THESE WIRING SYSTEMS -



SINGLE PHASE LINES

May be either two or three wire. If three wire, be sure it is 110-220 volt. The center wire is neutral and usually has no fuse

(FIG. NO. 1)



THREE PHASE LINES

May be either three or four wire and either 220, 440, etc. volt. Any two legs of a three phase line furnish single phase. Care must be exercised in being sure the Welder is connected to single phase and of same voltage as shown on Welder nameplate. The neutral wire of a four wire line usually has no fuse.

(FIG. NO. 2)

and by comparing them with the wiring in the shop where the Welder is being installed, the proper legs to which the Welder should be connected can usually be determined. If any doubt exists, it is advisable to have a licensed electrician make the installation.

Be sure the ground cable is grounded, so that the machine itself is grounded.

If the Welder does not seem to be delivering its rated maximum heat, at its highest stage, the voltage of the A.C. line should be checked at the end of the Welder cable, and with the machine in operation at its highest heat. If it is found that the voltage drops below 220 volts (power company will make the necessary test) then heavier wiring must be installed from the Welder cable to the main box in the building. In some cases it may be necessary to have the power company install a larger transformer outside the building, which work is usually done gratis.

TO OPERATE AS A SPOT WELDER

Before any use is made of the Spot Welder, the parts which are to be joined MUST BE SECURELY CLAMPED IN PLACE (This is important) with "C" clamps, or a similar means. The sheet metal must be reasonably clean of grease or paint, so that a good contact may be made with the copper Spot Welder Tongs. It is possible to burn through a greasy coating, but this introduces unnecessary burning of the Spot Welder Tongs, and causes them to wear faster. The tongs must be kept reasonably clean for the same reason, that is, to prevent burning and arcing.

Occasionally, it will be necessary to file the points of the Tongs to keep them clean and pointed. Care must be exercised in placing the Tongs in the hand piece to prevent their machined surfaces from becoming burred or otherwise damaged. Their fitting perfectly is important, as good electrical contact is necessary. In case they become damaged, they should be dressed smooth with a fine grade of sandpaper.

Select the necessary jaws to perform the desired operation (refer to spot welding illustrations showing each operation on car body to be welded, and note that the numbers correspond to the numbers on the base of each tong.) Next, place the tongs in the hand piece assembly, and adjust them so that the points are in line and make proper contact when they are closed. Tighten them securely with the thumb nuts.

- TO MAKE A SPOT WELD -

To make a spot weld, place the hand piece in position so that one tong is on one side, and the other is on the other side of the two pieces of metal to be welded. Close the handles firmly together, bringing the tongs into contact with the metals. Next, press the switch button in the handle, holding it down until the metal to be spotted has turned red hot in a small circle around the points of the tongs. (This usually requires from 5 to 10 seconds).

The current is flowing in the circuit, and through the metal, while the switch button is closed. After releasing the button, open the hand piece and proceed to the next place to be spotted, and repeat the operation.

If the pieces of metal to be spotted are not clamped tightly together, the current may arc between them and cause burning instead of welding. Also, if the current is not allowed to flow long enough, a good weld will not be obtained, because the heat will not be sufficient to properly fuse the metals.

It is also possible to apply the heat for too long a period, in which case the metal becomes overheated, and often results in burning a hole or a crater. A good spot will be smooth, except for a slight indentation where the points of the tongs were in contact with the metal.

A little practice on the part of the operator will result in his being able to make perfect welds. IF THE SPOT WELDER TONGS BECOME EXCESSIVELY HOT, DUE TO A LARGE NUMBER OF SPOTS BEING MADE, THEY CAN BE DIPPED IN WATER AND COOLED without damage to tongs.

- PROCEDURE FOR SPOT WELDING -

Before removing the damaged top, it is important that the body be re-aligned if necessary, so that the new top will fit perfectly when placed in position. It is much easier to do any re-alignment that may be necessary before the old top is removed, than after it has been cut from the body.

To remove the top, it should be cut just above the original spot welded seam, as indicated in Fig. No. 12, and while this leaves a double thickness of metal at the seam, it does not, in any way, interfere with the installation of the new top, as the weld can be made through the three thicknesses of metal.

After the old top has been removed, the flanges of the body should be ground smooth and clean, so that all paint and dirt is removed.

Before fitting and clamping the new top in place, remove the paint with thinner from both surfaces of the top flanges, so as to insure good electrical contact for the spot welder tongs.

If the top is to be installed on a coach, it is necessary to cut a portion of the flanges from the top, that is, all of that portion that extends backward from the rear end of the door opening. (See Fig. No. 7).

The first operation is to spot weld the top to the windshield frame, using tongs Nos. 2 and 3, as is shown in Fig. No. 9. Fig. No. 10 illustrates spot welding the top to the windshield of a 1936 Chevrolet body. Note that the tongs used are Nos. 2 and 7.

When the windshield is welded, next proceed to spot weld the rear deck frame at the rear window to the top, using Tongs Nos. 3 and 4. The procedure is as shown in Fig. No. 11. If preferred, tongs Nos. 2 and 3 may be used.

Then spot weld the roof rail to the top over the door openings, first on one side of the body, and then the other, using Tongs Nos. 1 and 2 as shown in Figs. Nos. 12

and 13, which method insures a perfectly satisfactory job, but in case extra precaution is desired, in order to prevent any possibility of squeaking, then additional spots can be made on the lower portion of the flange, as is shown in Fig. No. 14, using Tongs Nos. 2 and 3, or Tongs Nos. 2 and 7, if preferred.

The next step is to spot weld the flanges of the top to the rear quarter panels, inside and over the window openings on both sides of the body, using tongs Nos. 3 and 4, as shown in Figs. Nos. 15 and 16, which operation completes the spot welding, and it is then necessary to arc weld the seams, joining the top to the body as shown in Fig. 6.

The reason for adhering to the procedure outlined in the foregoing is that if the body does not line up perfectly with the new top, this mis-alignment is easily overcome, while if some other sequence than the foregoing is followed, buckles will invariably occur in the top.

- REPLACEMENT OF METAL TOPS ON STUDEBAKER CARS -

The inner body construction of Studebaker cars differs from that of most other makes along the seams where the top is joined to the rear quarter panel and where the roof rail is attached to the top over the door openings. A four-sided frame is used, and the spot welding has to be done by inserting the tongs through openings in the four-sided frame. It is because of this that the specially constructed tongs Nos. 5 and 6 are required.

The windshield frame is attached to the top the same as on other cars using tongs Nos. 2 and 3 as shown in Fig. No. 9. Fig. No. 17 illustrates the method used for spot welding the rear window frame to the top, using the same tongs. Figs. Nos. 18 and 19 illustrate the box frame construction, and show the tongs to use in spot welding the top to the roof rail over the door openings (Tongs Nos. 2 and 6) and also the rear quarter panel to the top (Tongs Nos. 3 and 5). The operation is the same on Willys bodies.

- PROCEDURE FOR SPOT WELDING GALVANIZED SHEETS -

- (TONGS SHOULD BE WELL ROUNDED TO SHARP, AT THE TIPS) -

Galvanized sheet metal is very difficult to successfully spot weld because of its coating of zinc, which has to be removed before the steel underneath will properly fuse together to form a strong weld. The removal of the zinc takes place when an arc occurs between the metal being welded, which arc is caused by the presence of oxygen. It is for this reason that two perfectly flat sheets, parallel to each other, are very difficult to weld until they are upset (flanged) as shown in Figs. Nos. 3, 4 and 5 below. Then, by using the proper pressure on the hand clamps, which can be determined through practice, successful spots can be secured rapidly, and without difficulty.

DOUBLE LAP
(4 Layers to Weld)
NORMAL TONG PRESSURE

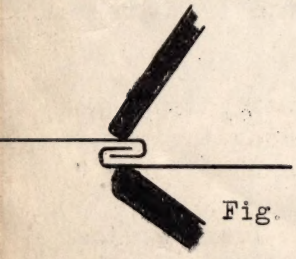


Fig. No. 3

$1\frac{1}{2}$ LAP
(3 Layers to Weld)
FAIRLY LIGHT
TONG PRESSURE

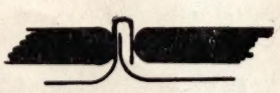


Fig. No. 4

SINGLE FLANGE
(2 Layers to Weld)
(Lap Weld - Same)
VERY LIGHT
TONG PRESSURE

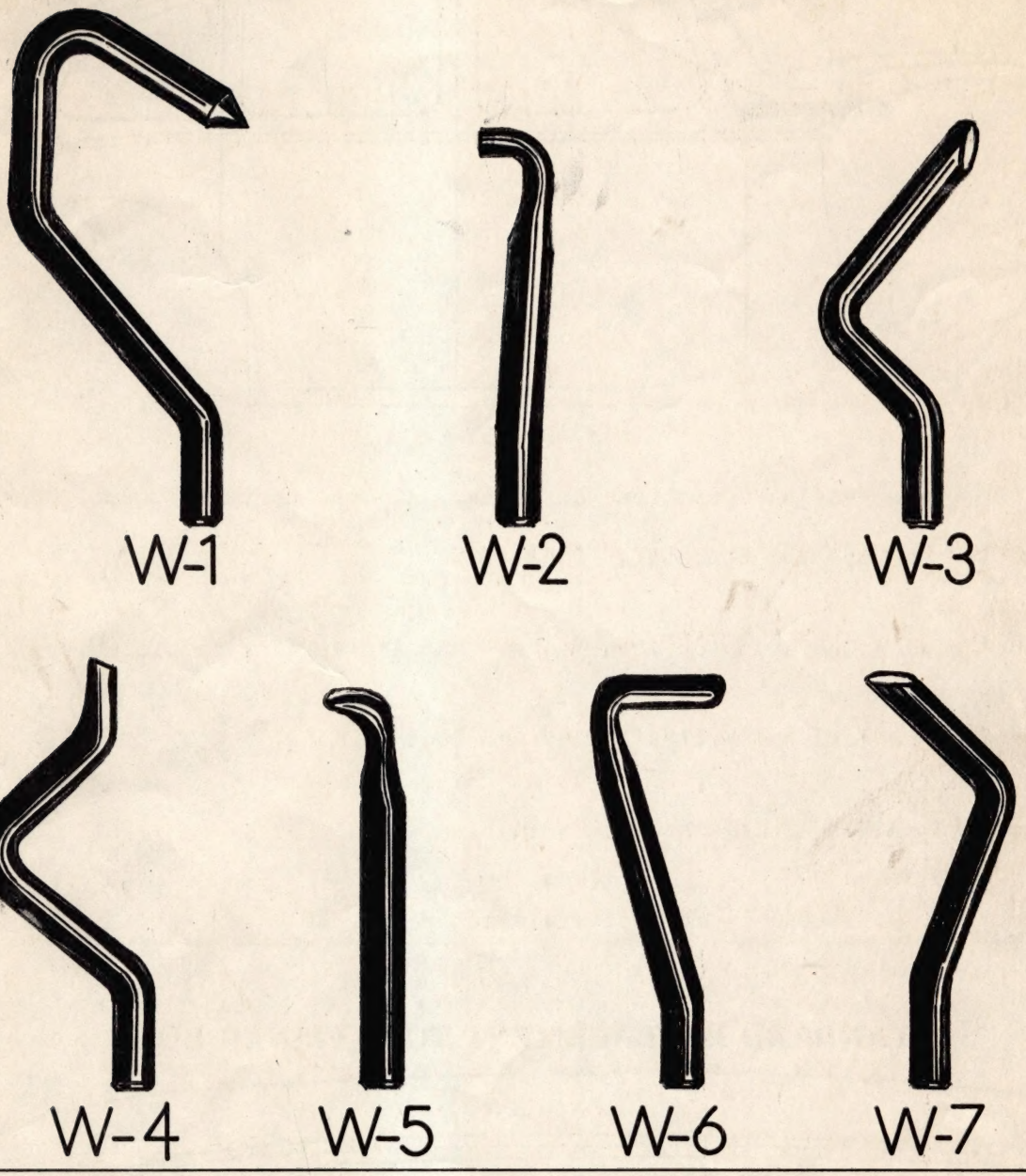
Fig. No. 5

(spacing of flanges is exaggerated for purpose of illustrations only).

For best results, tongs should be well rounded, to sharp, at the tips.

TONGS FOR SPOT WELDING

(ILLUSTRATIONS ARE SLIGHTLY LESS THAN ONE-THIRD ACTUAL SIZE)



Fisher Bodies require tongs W-1, W-2, W-3, W-4, and W-7.
Chrysler Corp., Packard Graham and Hudson Bodies require tongs W-1, W-2, W-3 and W-4.
Ford Bodies require tongs W-3 and W-4.
Studebaker Bodies require tongs W-2, W-3, W-4, W-5, W-6, and W-7.
Willys Bodies require tongs W-2, W-3, and W-6.
Nash Bodies require all arc welding.
Tongs W-5 and W-6 **have "Elkaloy" Tips.**
Allen will furnish quotations on special length or style tongs upon receipt of dimensional information, or will furnish unmachined rod in any length desired.
5/8" Unmachined Copper Rod - - - - - **Price per inch - 8¢.**

Refer to illustrations on the following pages showing each operation on car body to be welded, and note that the numbers correspond to the numbers on the base of each tong.

TYPICAL AUTOMOBILE BODY

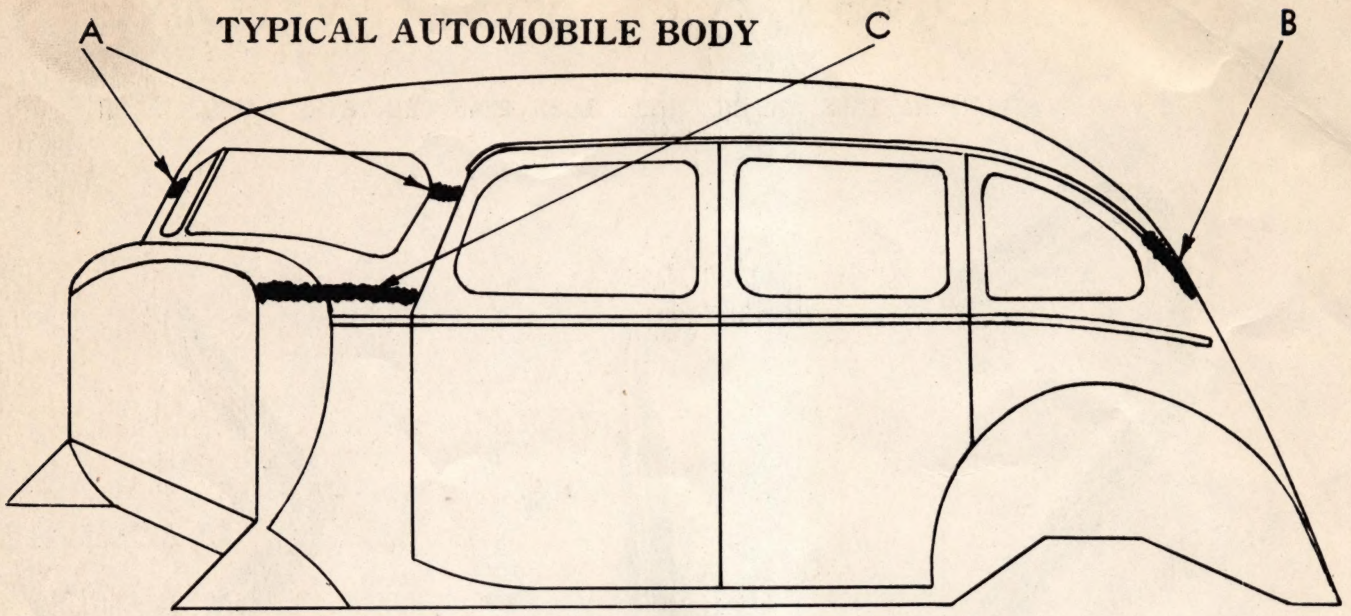


Fig. No. 6

"A" and "B" - Arc Welding Operations on Fisher, Hudson, Chrysler Corp., Graham, Packard and Studebaker Bodies.

"C" - Spot Welding Operation on Ford Bodies, and Arc Welding on all others.

All Operations on Ford and Willys Bodies are Spot Welding.

All Operations on Nash Bodies are Arc Welding.

(See Figs. Nos. 9, 11 and 14 for Spot Welding Operations).

STANDARD REPLACEMENT TOP - FISHER BODY

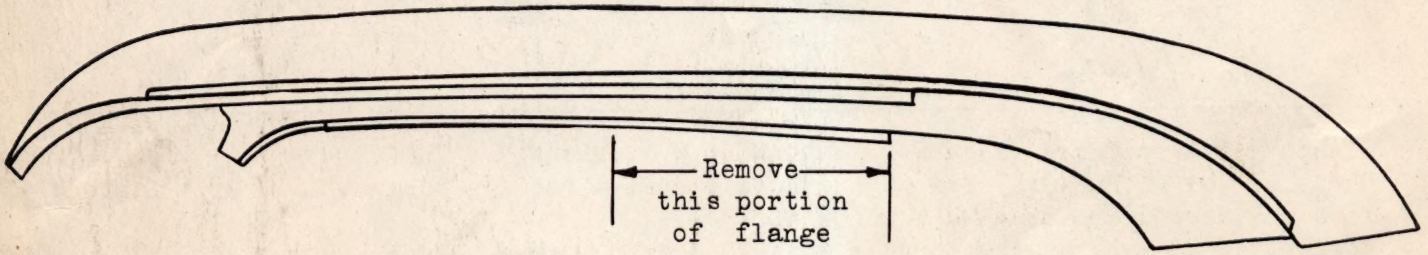
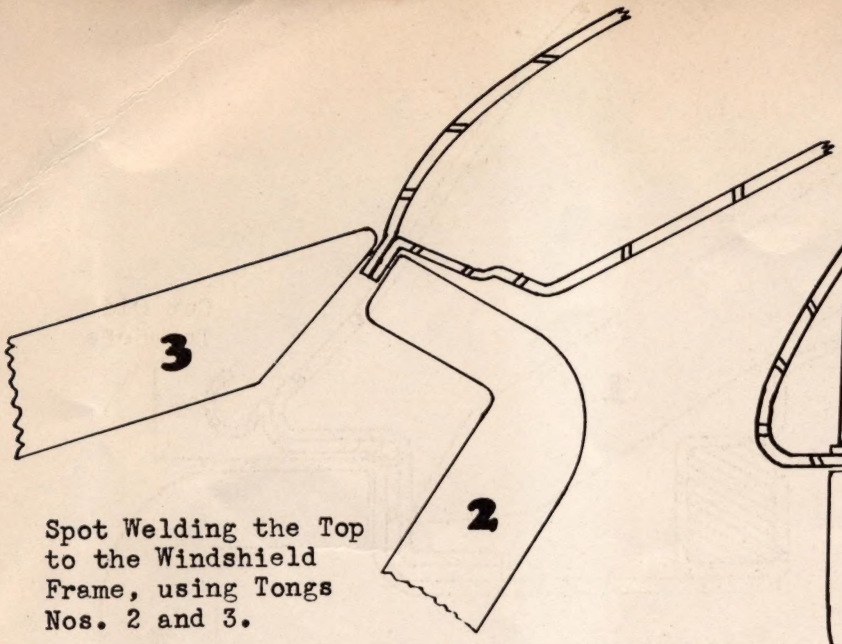


Fig. No. 7

NOTE: -

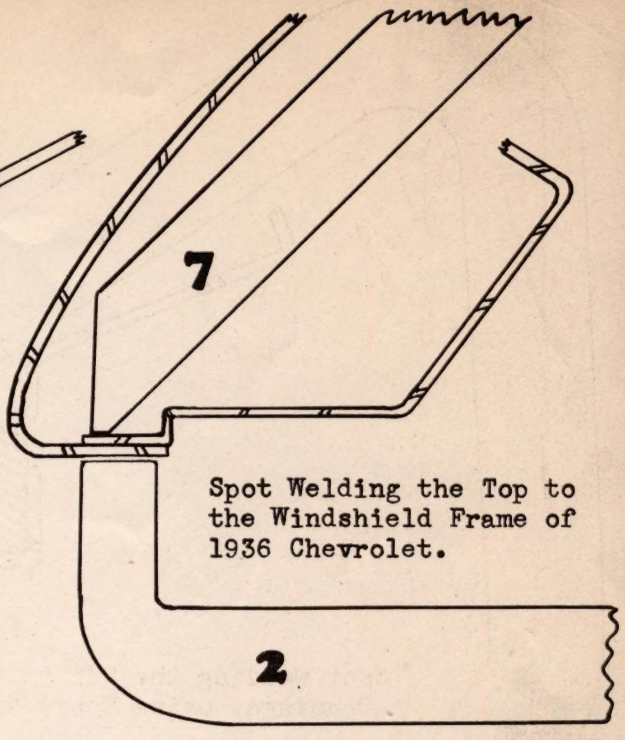
When installing a top on a Coach, cut flange as shown, and remove rear portion on each side of the top.



Spot Welding the Top to the Windshield Frame, using Tongs Nos. 2 and 3.

This operation is the same on Ford, Fisher, Studebaker, Hudson, Chrysler, Graham, Willys and Packard.

Fig. No. 9



Spot Welding the Top to the Windshield Frame of 1936 Chevrolet.

Fig. No. 10

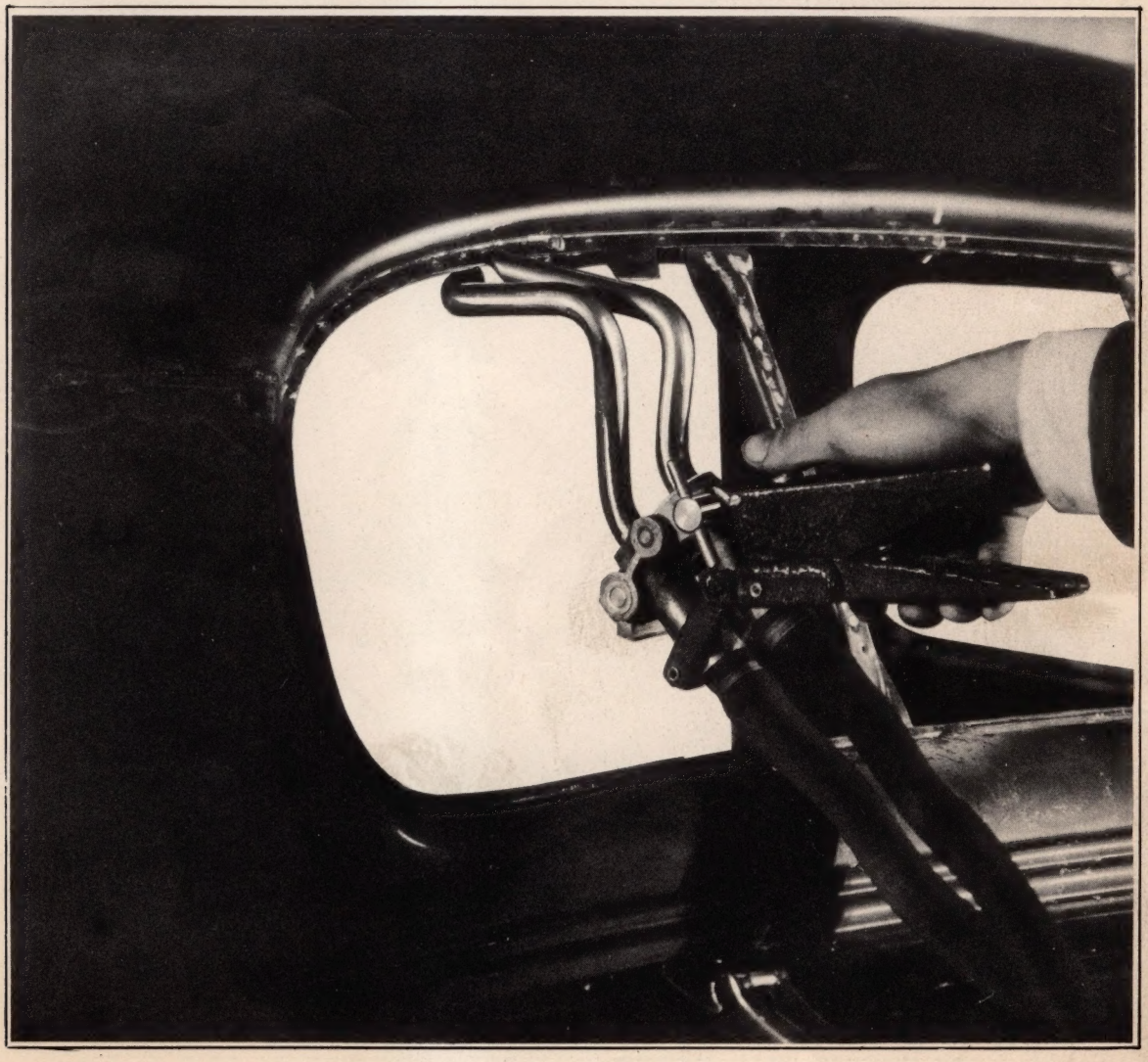


Fig. No. 11

Spot Welding Top to Rear Window Frame on Fisher, Chrysler, Graham, Hudson, Ford, Packard and Willys.

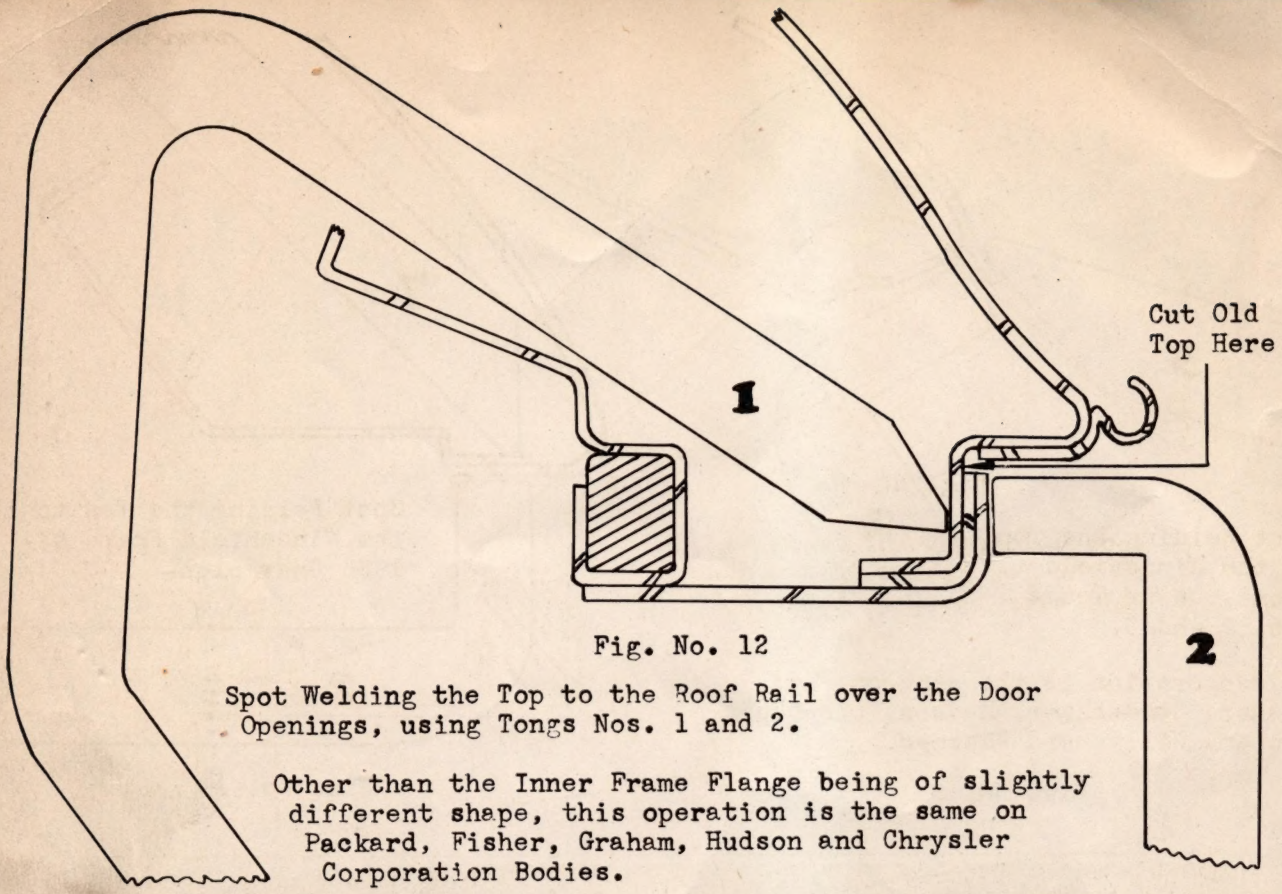


Fig. No. 12

Spot Welding the Top to the Roof Rail over the Door Openings, using Tongs Nos. 1 and 2.

Other than the Inner Frame Flange being of slightly different shape, this operation is the same on Packard, Fisher, Graham, Hudson and Chrysler Corporation Bodies.

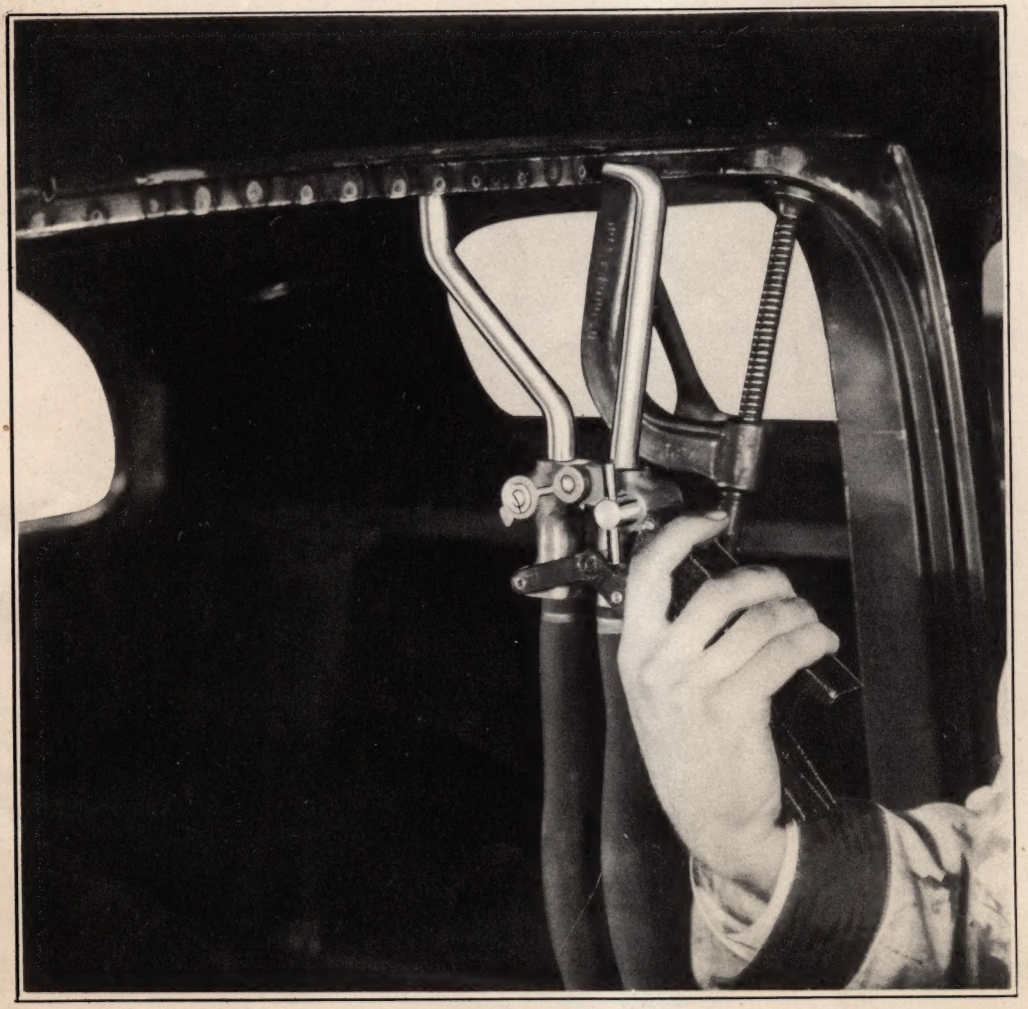


Fig. No. 13

Spot Welding the Top to the Roof Rail over the Door Opening of Packard, Fisher, Graham, Hudson, Ford and Chrysler.

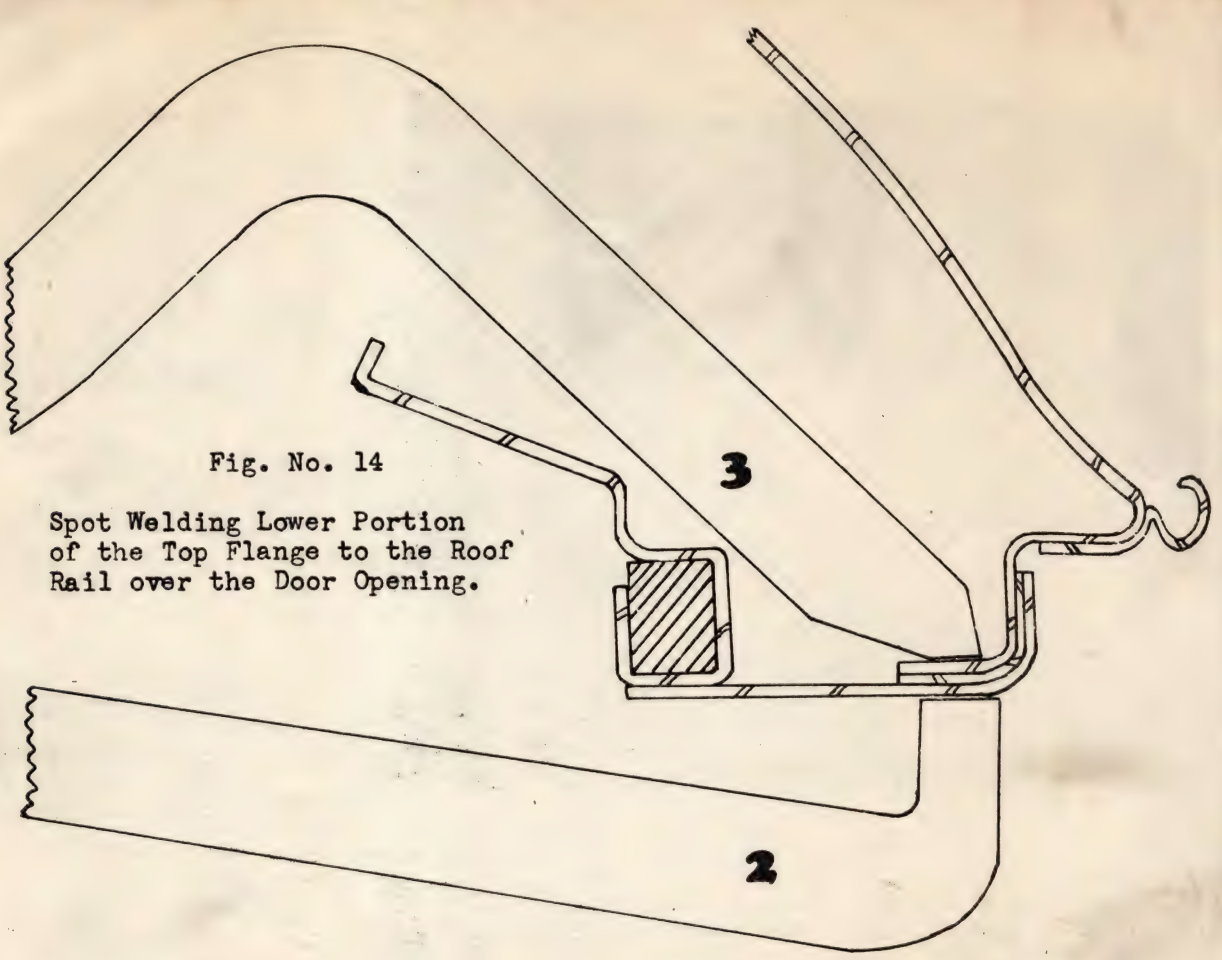


Fig. No. 14

Spot Welding Lower Portion of the Top Flange to the Roof Rail over the Door Opening.

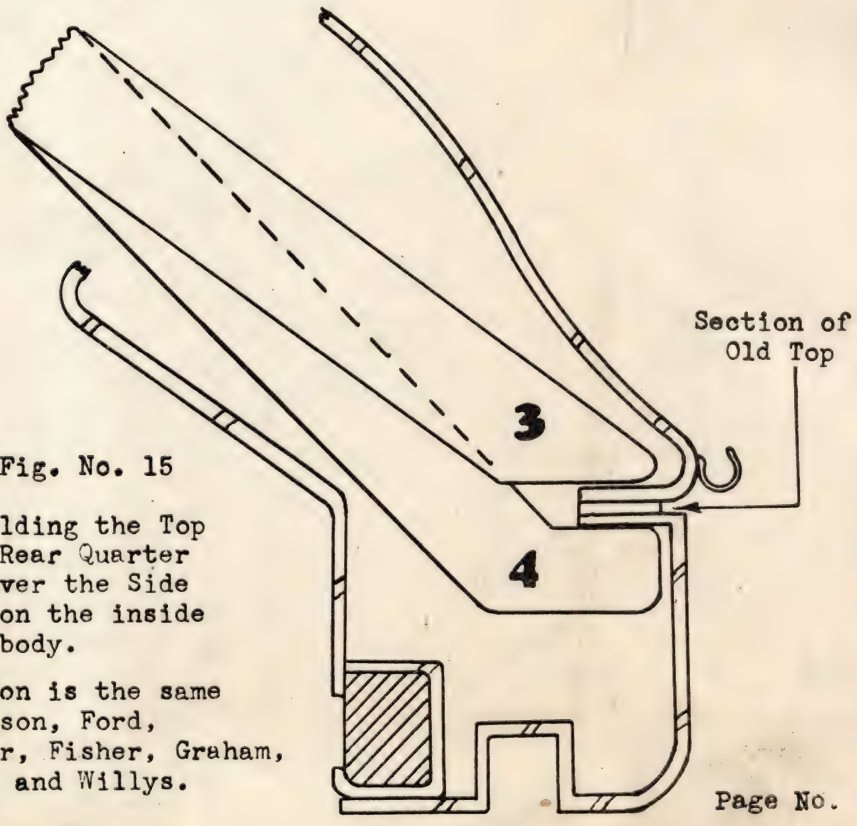


Fig. No. 15

Spot Welding the Top to the Rear Quarter Panel over the Side Window on the inside of the body.

Operation is the same for Hudson, Ford, Chrysler, Fisher, Graham, Packard and Willys.

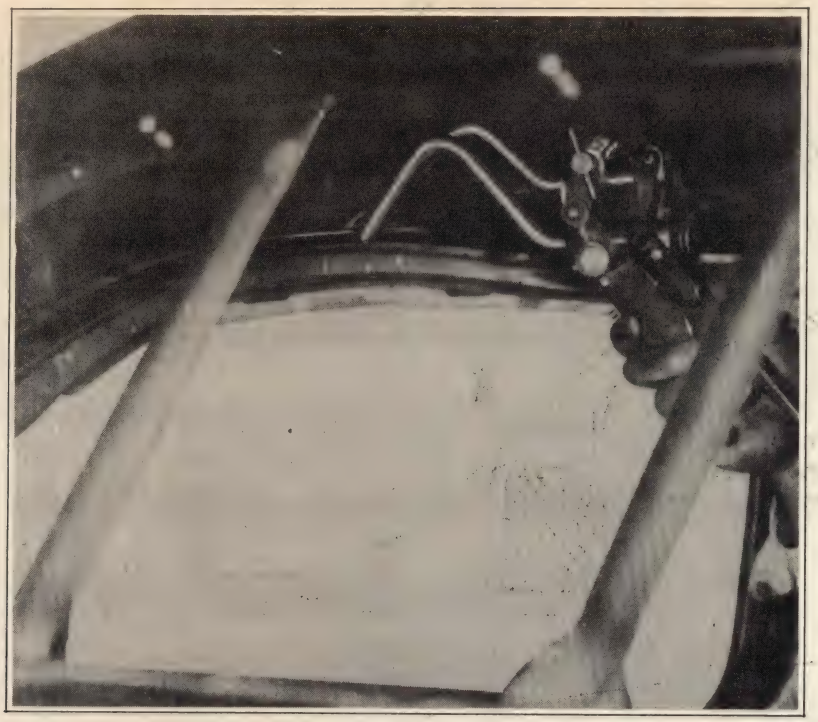


Fig. No. 16

Spot Welding the Top to the Rear Quarter Panel over the Side Window on the inside of the body of Hudson, Ford, Fisher, Chrysler, Graham, Packard and Willys Bodies.

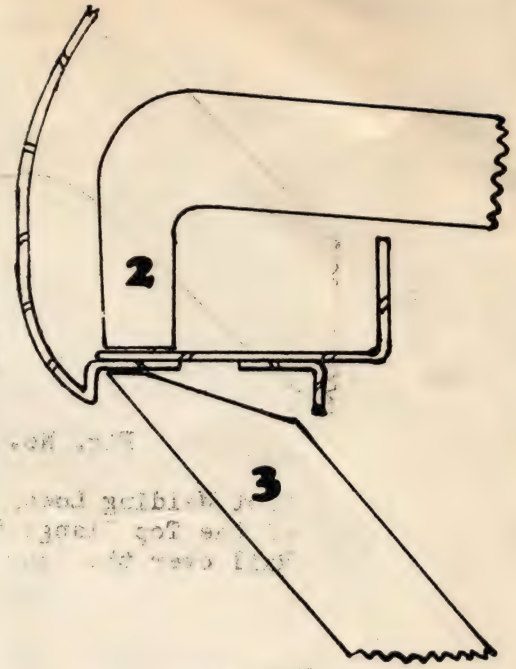


Fig. No. 17

Spot Welding Top to Rear Window of 1937 Studebaker

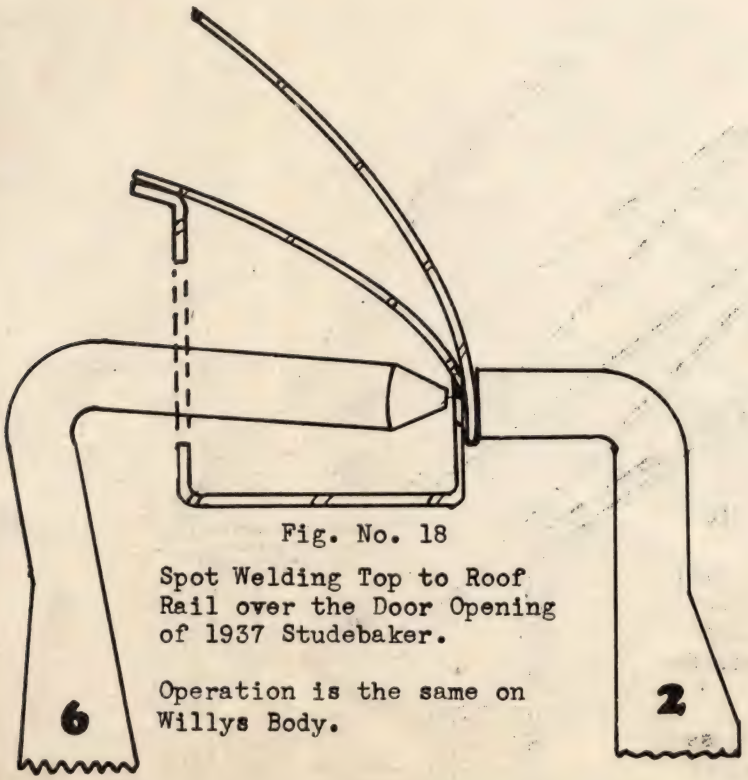


Fig. No. 18

Spot Welding Top to Roof Rail over the Door Opening of 1937 Studebaker.

Operation is the same on Willys Body.

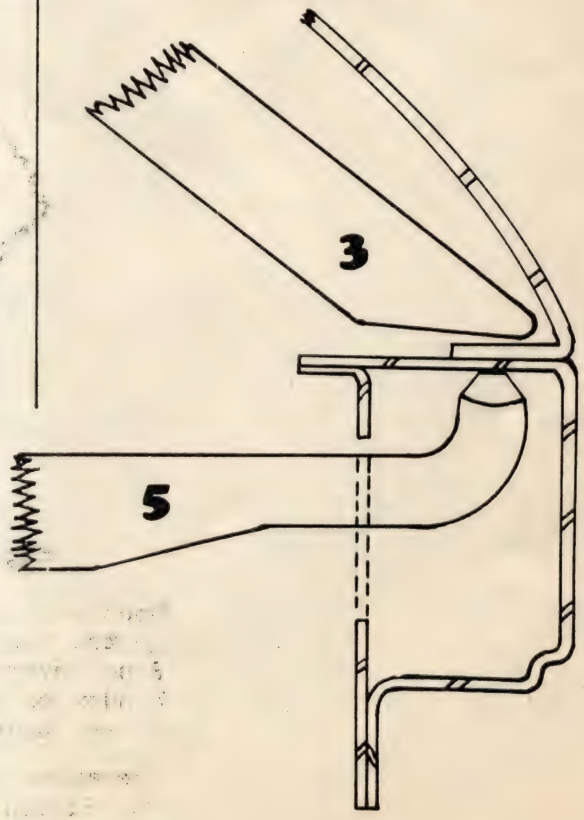


Fig. No. 19

Spot Welding Rear Quarter Panel to Top of 1937 Studebaker

TO OPERATE AS AN ARC WELDER

- SELECTION OF ROD SIZE AND HEAT STAGES -

The stencil on the front of the Welder contains complete information as to the size rod to use for all thicknesses of metal and what plug to use for each heat range.

The permanently attached cable on the front of the Welder is the ground lead, and is so marked, and must be securely grounded to the metal being welded.

Then, to obtain from 15 to 35 amperes, plug the detachable cable into the #1 socket, and rotate the control switch. There are six positions on the switch, which provide six heats for each plug-in socket. EXAMPLE - With the cable in #1 socket, and the control switch on the lower left-hand button, 15 amperes will be obtained. On the next higher position 19 amperes, then 23 amperes, then 27, then 31, and the maximum of 35 on the lower right-hand button. With the cable in socket #2, the heat obtained ranges from 40 to 60 amperes, in progressive steps between these heats, as the control dial is rotated.

NOTE: - When using 15 to 25 amperes, it is sometimes difficult to start the arc if the metal is cold or extremely dirty, in which case it should be started at a higher rate, and then lowered by turning the control tap switch to its lower side.

- WELDING ROD -

Always use A.C. Welding Rod, as D.C. Rod is very different in action and makes striking and maintaining an arc a difficult operation. In addition, the deposits are in small beads or drops, which cause a rough finish weld, and the dropping action produces minute temporary shorts in the welding circuit which, in the case of long continuous operation, raises the transformer temperature above normal.

A.C. Rods strike and maintain an arc easily, and give a strong, non-brittle weld. These rods flow in a continuous vapor and weld vertically and overhead with perfect satisfaction. An important feature of A.C. Rod is that the welded joint has a minimum tensile strength of 50,000 lbs. to the square inch, and the welds, even in the case of cast iron, are tough and ductile, which may be machined, ground, or filed, with the same ease as the parent metal. This is because the coating on the rod shields the arc from the surrounding atmosphere, preventing oxidation, and finally deposits itself over the finished weld, allowing it to cool slowly.

LEARNING TO WELD

Study the several types of welds shown in Fig. No. 20, (top next page). Thick materials are easier to weld than sheet metal, and because of this, it is suggested that practice at first be on heavy stock, and at medium or high heat ranges. Before beginning to weld, the metals should be free from oil, rust, scale, etc. Scale and rust can be removed with a scratch brush.

THE FIRST STEP is in learning to strike and maintain the arc, which is done in a manner similar to striking a match. Note from Fig. No. 20 (next page) that the tip of the rod is brought into contact with the metal by a short sweeping motion, which, as soon as the arc is struck, carries the rod away from the metal about 1/8 of an inch. Before any attempt to weld is made, the operator should practice striking and holding the arc until it becomes largely an automatic procedure.

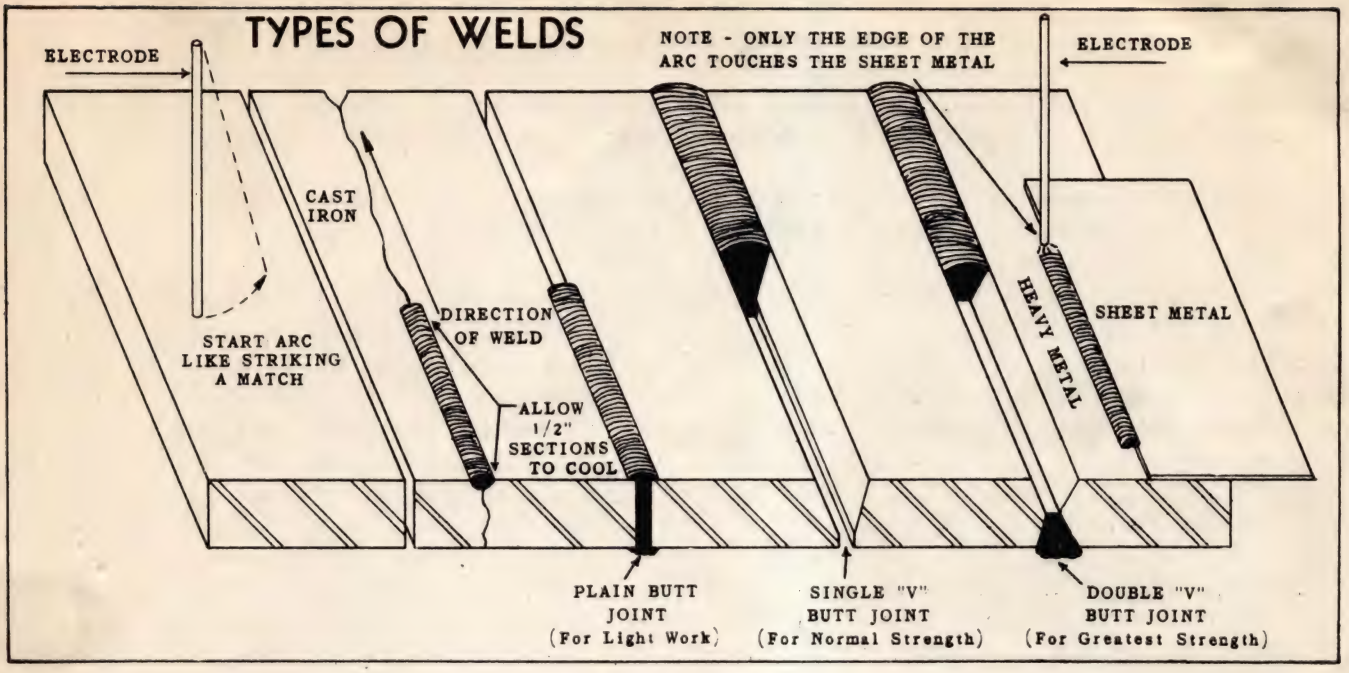


Fig. No. 20

It will be noted that the heat is LESS when the rod is held close to the metal, and GREATER when farther away, which is just the opposite of acetylene welding.

THE SECOND STEP is to maintain the arc by keeping a constant gap between the metal to be welded, and the welding rod. This is accomplished by moving the hand slowly in a downward motion at the same speed that the rod burns away, and at the same time the rod should be moved slowly with a uniform motion along the direction the weld is being made. The rate of travel will be governed by the rate of deposit of the welding rod on the metal being welded, and it is advisable to practice depositing the welding rod in a straight line on a single piece of metal. No attempt should be made to join two pieces of metal until the above has been mastered.

THE THIRD STEP is to attempt a butt weld by placing two pieces of metal together, end to end. The rod should then be moved in a zig-zag manner along the seam to be welded. This produces a path for the welding rod, much as are the teeth on a saw. The purpose of this is to secure sufficient penetration of the rod material to the metals on either side of the weld to obtain maximum strength.

THE FOURTH STEP, after becoming proficient in the foregoing, is to place two pieces of metal in a vertical position, and with the amperage of the machine reduced, proceed exactly as is explained in the preceding paragraph, always starting from the top of the seam in order to secure the smoothest weld.

THE FIFTH STEP is to place two pieces of metal in a horizontal position, and weld them from the underneath side.

Having mastered all of these steps, the operator is now ready to weld sheet metal. To do this, secure an automobile fender, or similar material, and with the Welder control on one of the lower heat stages, proceed in the same manner as explained in the foregoing. Care must be exercised in holding a constant and very close arc, as otherwise, the metal being welded will burn through. Also, greater care must be used to strike the arc, than when welding thicker metals, as with the small amperage this operation is more difficult.

As in the case of learning to weld heavy metal, no attempt should be made to weld a seam, or tear in the sheet metal, until the operator has mastered the ability to weld a neat bead in a straight line. In the event burning is experienced on an exceptionally thin and rusty piece of sheet metal, a fourth motion of the hand and welding rod is necessary, namely, a rapid up and down motion, much the same as is obtained with an air hammer. Always remember to hold a very close arc, after it has been well established, as the closer the arc, the less the heat.

- SPRING STEEL WELDING -

A very satisfactory butt weld of good strength may be made, as in the case of a bumper, by welding both sides of the break, but if exceptionally great strength is desired, it is advisable, after the butt weld is completed, to weld a short piece of spring steel over one side of the bar, and to weld the edges only. Never, in any case, weld the ends of the piece applied, as to do so will defeat the purpose of putting on the extra bar, because the temper in the large pieces will have been destroyed.

NOTE: - In the case of fairly thin pieces of the above material, they may be butted tight to each other before welding, but when heavy material is encountered, the edges should be beveled, or placed not closer than 1/8 of an inch apart. See Fig. No. 20 - page 14.

- SHEET METAL WELDING -

The technique of sheet metal welding is covered under "Learning How to Weld". In addition to that information, the following should be observed: - When welding on car bodies, metal tops, quarter panels, etc., it is advisable to first tack-weld the seam to be welded, at spaces of about 4 to 6 inches. Also, all or most of the solder on the old metal parts should be burned or scraped off before starting to weld. However, it is not necessary to remove all solder, as has to be done for acetylene welding, as good fusion can be made with the electric process, even though a small amount of solder is present.

The illustrations on page 17 show some of the many types of welds that can be made on sheet metal.

- WELDING SHEET METAL TO HEAVY STOCK -

This heading covers such subjects as: - Welding quarter panels to wheel housings (See Fig. No. 22 - page 17); welding rear or quarter panels to rear deck frames (See Fig. No. 23 - page 17); welding inner door panels to outer door panels; welding metal tops to windshield frames.

When any of the above welds are to be made, or similar cases arise, a 3/32" rod is used with a heat somewhat stronger than would be used on sheet metal only. In fact, the heat can be considerably greater if the tip of the welding rod is held directly over the heavy material, and the weld laid along the edge of the sheet metal. This eliminates burning the sheet metal, and a strong, neat weld will result. (See Fig. No. 20 - page 14). Also, contrary to acetylene methods, there will be no warpage of the sheet metal, as there is no pre-heating, and the heat line is small.

- CAST IRON WELDING -

Because of the characteristic of cast iron to crack after welding, due to expansion under heat that has been built up, and the consequent contraction when cooling off, it is necessary to weld not more than 1/2 inch at a time. See Fig. No. 20 - page 14, which illustrates how to prevent excessive heat from being built up. The welding technique is the same as with steel, but in addition to being limited to 1/2 inch at a time, it is also advisable, if an exceptionally long crack is to be welded, to make a 1/4 inch tack weld, spaced about 2 to 3 inches apart. (See next page also).

IMPORTANT! When welding cast iron, ALWAYS use Cast Iron Rod, and the least amount of heat possible to do the job, so as not to affect the quality of the casting being welded.

- MALLEABLE IRON WELDING -

The same technique is used in Malleable Iron Welding as on Cast Iron, either of which metals can be welded separately, or joined together, or either can be welded to steel. Use Cast Iron Rod.

- WELDING CAST ALUMINUM -

Cast Aluminum is very satisfactorily welded, as in the case of aluminum cylinder heads, by putting into the electrode holder a short piece of 3/8" Welding Carbon, and using a medium heat. The carbon is used to maintain the arc, and a 1/8" or 5/32" coated aluminum welding rod is fed by the operator's other hand.

NOTE: - It is important to remove all scale from an aluminum weld before going over it a second time, or starting again, after breaking the arc.

- BRAZING -

Brazing is done with a carbon in the electrode holder, the same as with aluminum, and a coated brass rod is fed into the arc. To use the carbon electrode, sharpen it to a tapered point, approximately 1/16" diameter at the tip, tapering back a distance of at least 3/4". Grip the electrode back 2½" to 3" from the tapered point.

- FILLET WELDING -

When it is desired to build up an angle, formed by two pieces of metal to be welded, it is best to build up several layers of welding, one on top of the previous one, until the desired depth is secured.

- CUTTING METALS -

The cutting of metals is best accomplished with a medium or large size steel welding rod, using a medium or high heat. The method used consists of moving the rod back and forth over the part to be cut, and with this movement slowly progressing ahead. In the case of vertical cutting, always start at the bottom to allow the molten metal to fall away instead of piling up on the metal being cut.

- REMEDY FOR EYEBURN -

DO NOT look at a welding arc without the protection of a helmet or hand shield, but in case of eyeburn, there will be no permanent injury although the pain will be considerable for several hours.

To secure immediate relief place a drop of 2% Butyn solution in the eye. Two applications are usually sufficient.

If Butyn is not available, treat the eye with sweet oil, once each hour, until the acute burning sensation disappears. A 10% solution of Argyrol may be used afterwards, to aid in healing, but should NOT be used more often than ONCE in every FIVE hours.

- BOOK ON WELDING -

A very complete treatise on the art of welding is published by the McGraw-Hill Company, 330 West 42nd Street, New York City, which is called "Manual of Electric Arc Welding", by Hubert. The purchase of the book is suggested.

Fig. No. 4

Welding a cracked fender. Note that it is unnecessary to reinforce the fender underneath for the reason that the weld penetrates the metal as much on the bottom as on the top. When the weld is finished, it can be filed or sanded smooth, and then refinished. It is always advisable to clamp the broken edges of the fender together before starting to weld.

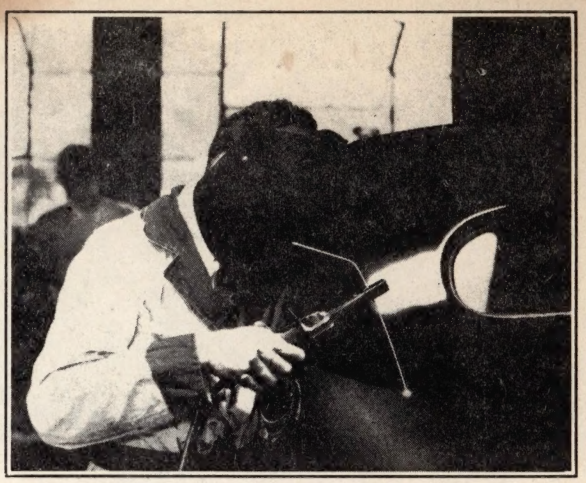


Fig. No. 6

Welding a new quarter panel on the rear deck of a coupe. Note the absence of warpage which eliminates the necessity of sinking and soldering after the weld is made. Tacking the panel at several points before starting the final operation is advisable.

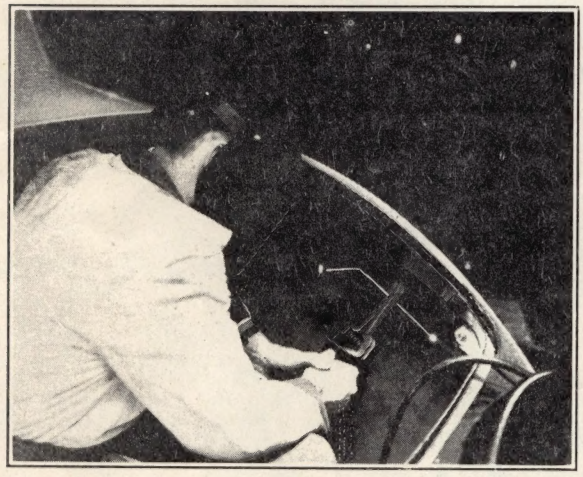


Fig. No. 5

Welding quarter panels to rear wheel housings from the inside of the body. Illustration shows this work being done in the rear deck of a coupe. It is an example of welding thin metal to thick.

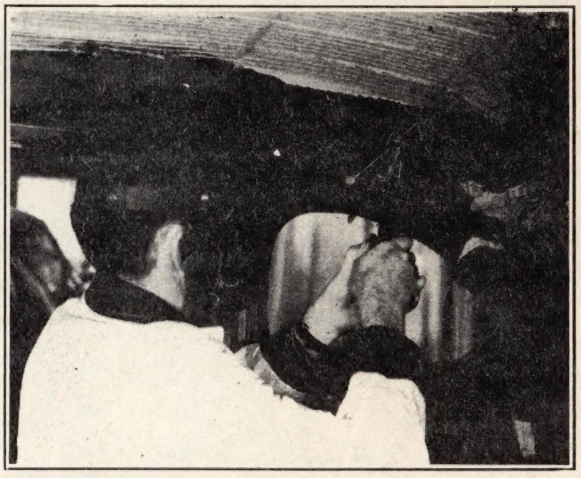


Fig. No. 7

Welding a metal top to a quarter panel, above the door frame, from the inside of the body. More trim material was removed than was necessary as the job shown was originally prepared for a gas weld. The A.C. weld that was made caused no warpage, or burning of the metal.

(Fig. No. 8) This illustration is of a quarter panel being welded to a coupe rear deck frame, showing how thin metal can be joined perfectly to thick metal.